



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification<sup>4</sup> :</b> <b>A47L 1/15, 13/17</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 89/ 05114</b> <b>(43) International Publication Date:</b> 15 June 1989 (15.06.89)
<b>(21) International Application Number:</b> PCT/EP88/01088 <b>(22) International Filing Date:</b> 28 November 1988 (28.11.88) <b>(31) Priority Application Number:</b> 87/16857 <b>(32) Priority Date:</b> 4 December 1987 (04.12.87) <b>(33) Priority Country:</b> FR  <b>(71) Applicant (for all designated States except US):</b> RECKITT & COLMAN [FR/FR]; 15, rue Ampère, F-91301 Massy (FR).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only) :</b> BRUNET, Philippe [FR/FR]; 26, mail Jean-de-Dunois, F-28000 Chartres (FR). PEYRONNET, Didier [FR/FR]; 10, rue Daniel-Casanova, F-28000 Chartres (FR).		<b>(74) Agent:</b> RINUY, SANTARELLI; 14, avenue de la Grande-Armée, F-75017 Paris (FR).  <b>(81) Designated States:</b> AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), NO, SE (European patent), US.  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> DISPOSABLE IMPREGNATED WIPE FOR CLEANING OR MAINTAINING HARD SURFACES		
<b>(57) Abstract</b> <p>The disposable impregnated wipe consists of a woven or non-woven hydrophilic material, obtained by wet or dry method and having a maximum absorption capacity for water of at least 200 % by weight in the dry state, impregnated with an aqueous composition to a level not exceeding 50 % of the maximum absorption capacity and is characterized in that the aqueous composition occurs in the form of an aqueous solution containing at least 4 % by weight based on the total weight of the aqueous composition of at least one water-miscible solvent and at least one mineral or organic acid in amount sufficient to produce an acid pH in the said solution.</p>		

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DISPOSABLE IMPREGNATED WIPE FOR CLEANING OR MAINTAINING  
HARD SURFACES.

The present invention relates to a disposable  
impregnated wipe for cleaning or upkeep of surfaces,  
5 such as glass, mirrors, tiles or other household sur-  
faces.

A number of wipes impregnated or coated with  
products for cleaning or maintaining various household  
surfaces are already known. In general such wipes have  
10 as object to eliminate soil and/or to deposit a layer of  
products for protecting or improving the state of the  
surface. In the majority of cases they exist in the  
moist state in the form of absorbent substrates impre-  
gnated with liquid compositions. Thus, British Patent  
15 Specification No 1,461,730 (Johnson) discloses a dispo-  
sable wipe having a liquids absorbance capacity of at  
least 200 % by weight, impregnated to at most 50 % of  
the said absorption capacity, with a composition in the  
form of an oil-in-water emulsion. This disposable impre-  
20 gnated wipe is used for applying a protective polysilo-  
xane and mineral oil based film to the surface to be  
treated.

Similarly, the specification to EP-A-0,211,773  
(Kimberly-Clark) relates to a disposable wipe impregna-  
25 ted with a composition comprising a wax, a silicone oil  
and a detergent or soap. When this wipe is partially  
impregnated with this composition, it can absorb water  
in amount comprising between 200 % and 800 % of its  
weight. This wipe is used for applying a protective film  
30 based on wax and silicone oil on a car still wet after  
washing it.

United States Patent No 4,666,621 (Clark et  
al) relates to a wipe impregnated with a liquid composi-  
tion for cleaning hard surfaces without leaving trails  
35 or fluff, comprising a non-woven material containing  
wood pulp and synthetic fibres, the liquid composition

including about 0.001 to about 1 per cent by weight of a surfactant, about 1 to about 40 per cent by weight of an aliphatic mono-alcohol having 1 to 6 carbon atoms and about 60 to about 99 per cent by weight of demineralized water, the non-woven material containing in addition about 0.225 to about 2.25 per cent by weight with respect to the weight of a non-woven material of an acrylic polymer. This wipe, however, leaves slight trails on the clean glass surface, when it is used in a single horizontal pass.

The Applicant has established as objective to obtain a single use disposable wipe impregnated with a liquid composition in conditions such that in use, it leads in part to the total elimination of soil and in part to the appearance of the surface free from trails or films resulting from deposition of any cleaning product with which it is impregnated or of the substrate itself.

These conditions are connected with the nature of the substrate itself which must meet the following criteria :

- resistance to tearing in the moist state,
- ability to absorb water to at least 200 % of its dry weight,
- insolubility in anyone of the constituents of the liquid composition or their mixtures,
- absence of the ability to liberate or to salt out insoluble solid materials.

Materials meeting these conditions are preferably chosen from amongst hydrophilic woven materials which do not produce fluff, such as cotton fabrics and other cellulosic fabrics, non-woven materials obtained by wet or dry methods.

Preferably, for use in the invention the materials have a superficial density or grammage of at

least 20 g/m<sup>2</sup>.

These conditions are equally connected with the nature of the impregnation composition and the quantity of the latter retained by the substrate, the quantity being expressed as a percentage of the maximum water absorption of the dry substrate.

The objective that the Applicant has fixed on is achieved by the object of the present invention which consists in disposable, impregnated wipe for cleaning and maintaining surfaces, including a hydrophilic woven or non-woven material obtained by wet or dry methods, having a maximum water absorption capacity of at least 200 % by weight, impregnated with an aqueous composition to a level of impregnation not exceeding 50 % of this maximum absorption capacity, which is characterized in that the aqueous composition is in the form of an aqueous solution containing :

at least one water-miscible solvent at a rate of at least 4 % by weight of the total weight of the aqueous composition, and

at least one mineral or organic acid in sufficient quantity to confer an acid pH on the said solution.

Advantageously, this pH is between 2 and 5 and optimally lies between 3.5 and 3.8.

Preferably, the mineral or organic acid is selected from acids having no physico-chemical action on the hydrophilic material, notably acetic, citric, maleic, phosphoric and alkylsulfonic acids.

Preferably each water-miscible solvent is selected from those volatile solvents with a vapour pressure at 20°C above 13 Pa, notably alcohols containing 1 to 4 carbon atoms, such as methanol, ethanol, isopropanol, butanol, glycols and glycol ethers containing 2 to 8 carbon atoms, notably monoethylene glycol butyl ether, and volatile silicones, notably DC 344 (marketed by Dow Corning).

In accordance with one preferred characteristic, the level of impregnation lies between 5 and 35 % of the maximum absorption capacity of the material in its dry state in strict dependence on the nature of the said material.

In accordance with another preferred characteristic the water-miscible solvent(s) are present at a level of .5 to 40 % by weight in relation to the total weight of the said aqueous solution.

In accordance with other characteristics, the aqueous solution can contain inter alia a small amount of an ionic, nonionic or amphoteric surfactant and small amounts of at least one product selected from disinfectants, perfumes, colorants and preservatives.

The following examples, given by way of illustration and non-limitatively, are wipes in accordance with the invention :

Example 1

A non-woven material (referred to hereafter by a letter A) supplied by Société Française des Non Tissés under reference 2406 of grammage  $35 \text{ g/m}^2$  was used.

It is a mixture of cellulose, cotton and polyester with an acrylic-vinyl binder in the ratio 75 % fibres per 25 % binder (wet method processed). This material has the ability to absorb water at  $125 \text{ g/m}^2$ .

A square (30 X 30 cm) of this material is impregnated at  $35 \text{ g/m}^2$  (approximately 25 % of the maximum absorption quantity) with an aqueous composition of the following formula :

30	Monoethyleneglycol butyl ether	8 % by weight
	Ethanol (95 %)	10 %
	Formaldehyde (30 %)	0.1 %
	Acetic acid (100 %)	0.1 %
	Water	81.8 %
35	pH = 3.7	

The impregnation was effected by putting the material into contact with the quantity of composition corresponding to the above level of impregnation (25 % by weight).

5 The cleaning efficacy of the material was tested in the following manner :

A fatty, soiling composition was prepared from lard, margarine, carbon black and ferrous and ferric oxides. 0.04 g of this composition was spread over a  
10 black pane of glass (30 X 40 cm).

The thus soiled glass was wiped off with regular to and for movements applied from top to bottom and then from left to right alternatively for 1 minute. The result was visually assessed by a group of fifteen  
15 people trained in this sort of assessment and scored on a scale 0 to 5 :

0 = very bad, many trails.  
1 = bad,  
2 = insufficient.  
20 3 = acceptable,  
4 = good,  
5 = excellent, no trails.

Table 1 hereafter gives the averages of the results obtained for comparison with different levels of  
25 impregnation on the same non-woven material.

This table shows that for an impregnation level of 25 % the score is 5, signifying excellent results with no trails on the black glass.

#### Example 2

30 Example 1 was followed except that different materials were used :

A non-woven (referred to hereafter as B) commercially referred to as PPV 3000 by Société Nordlys, of grammage 30 g/m<sup>2</sup> and maximum water absorption of 182 g/m<sup>2</sup> made from 100 % mixture of polypropylene/viscose,  
35 without a binder, obtained by a dry method was used.

A non-woven (referred to hereafter as C) commercially referred to as HOMECEL 90 by Société Kayserberg, of grammage  $90 \text{ g/m}^2$  and maximum water absorption capacity of  $880 \text{ g/m}^2$  made from 80 % cellulose fibres and 20 % acrylic binder, thermobonded and obtained by dry method was used.

Table II hereafter shows the results obtained for comparison with the results of Example 1.

This table shows that for non-woven B, a level of impregnation of 10 % gives results between good and excellent although for non-woven C, a level of impregnation of 35 % gives excellent results.

Example 2 bis

Examples 1 and 2 were followed except that different materials were used :

A non-woven (referred to hereafter as D) commercially referred to as 4175 by Société Nordlys, of grammage  $50 \text{ g/m}^2$  and maximum water absorption capacity  $465 \text{ g/m}^2$  made from 70 % cotton/viscose fibres and 30 % acrylic binder and obtained by dry method was used.

A non-woven (referred to hereafter as E) commercially referred to as 2426 by Société Française des Non Tissés, of grammage  $55 \text{ g/m}^2$  and maximum water absorption capacity  $179 \text{ g/m}^2$  made from 75 % cellulose/polyester fibres, and 25 % acrylic/vinyl binder and obtained by wet method was used.

A non-woven (referred to hereafter as F) commercially referred to as 1140 by Société Française des Non Tissés, of grammage  $45 \text{ g/m}^2$  and maximum water absorption  $160 \text{ g/m}^2$  made from 50 % cotton fibres, 30 % viscose fibres, 20 % acrylic binder and obtained by wet method.

Table II bis hereafter shows the results obtained for comparison with the results of Example 1. This table shows that for the non-woven D, a level of impregnation of 10 % gives almost excellent (assessed 4.8) results, although with the non-wovens E and F a



result assessed excellent is obtained for a level of impregnation of 25 %.

Example 3

The same non-woven material referred to as A in Example 1 was used.

Impregnation was done by means of the following composition :

	Monoethylene glycol butyl ether	8 % by weight,
	Ethanol (95 %)	10 %
10	Formaldehyde (30 %)	0.1 %
	Sodium lauryl ether sulphate	0.2 %
	Sodium alkylsulphate	0.4 %
	Water	81.3 %

The pH is 5 due to the technical grade of the surfactants used and which contain some acid.

The results obtained figure in table III below. A level of impregnation of 25 % produces results lying between good and excellent, slightly below the excellent result of Example 1.

Example 4

Various formulations of aqueous solution for impregnation were prepared and are combined in table IV.

Formulae 1 to 8 were prepared with an acid pH in accordance with the invention.

Formulae 9 to 11 were prepared with a non-acid pH, and by virtue of that fact are not part of the invention.

The non-woven A of Example 1 was impregnated to different levels using, each time, one of the formulae 1 to 11 and testing of efficacy was done as in Example 1.

Table V shows the results obtained.

It can be seen surprisingly that an acid pH for wipes impregnated with formulae 1 to 8 produces results assessed between acceptable and excellent, whereas formulae 9 to 11 where there has been no acid

added and the pH lies between 7.1 and 7.3 gave results assessed insufficient.

Table IV and V show still more surprisingly that those formulae that have pH between 3.5 and 3.8 lead to good or excellent results.

The test of Example 1 allows the determination of the conditions of maximum efficacy of an impregnated wipe in accordance with the present invention which have not been described in the preceding Examples.

It will be understood that in their commercial form, these wipes will be packaged in hermetically sealed containers to avoid undesirable evaporation of solvent.

TABLE I

Level of Impregnation(%)	0	5	15	20	25	30	35	50
Efficacy (Scale 0 to 5) Non-woven A	0.5	1.5	4.0	4.8	5.0	4.0	2.0	0.5

5

TABLE II

Level of Impregnation(%)	0	5	10	15	20	25	30	35	50
Efficacy of: Non-woven A	0.5	1.5	-	4.0	4.8	5.0	4.0	2.0	0.5
Non-woven B	-	3.0	4.5	4.0	-	1.5	-	0.5	-
Non-woven C	-	-	1.5	2.5	-	4.4	-	5.0	2.0

10

15

TABLE II bis

Level of Impregnation(%)	0	5	10	15	20	25	30	35	40	45	50
Efficacy of: Non-woven A	0.5	1.5	-	4.0	4.8	5.0	4.0	2.0	-	-	0.5
Non-woven D	0.5	3.5	4.8	4.4	2.7	1.7	1.0	-	-	-	-
Non-woven E	0.5	1.5	-	4.0	4.8	5.0	4.2	2.5	1.6	-	0.6
Non-woven F	-	-	3.0	4.4	4.9	5.0	4.5	2.9	1.7	-	-

20

25

TABLE III

Level of Impregnation(%)	0	5	10	15	20	25	30	35	40	50
Efficacy of: Non-woven A	0.5	-	1.7	-	4.2	4.5	3.4	1.7	-	-

30

Table IV

No of Formulae Components Stage by weight	1	2	3	4	5	6	7	8	9	10	11
Monoethylene glycol butyl ether	8		10	10		8	8	8	8	8	8
Ethanol (95%)	10	10			10	10	10	10	10	10	10
Sodium lauryl- ether sulphate						0.2				0.2	0.2
Sodium alkyl- sulphonate						0.4				0.4	0.4
Fluorinated surfactant* (POROPAC 1033 of Atochem)							0.1				0.1
Acetic acid (pure)	0.1		0.1		0.1	0.1	0.1	0.1			
Hydrochloric acid (expressed pure)		0.1		0.1							
Volatiles silicone (DC344 of Dow Corning)								0.5			
Formaldehyde (30%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Water	81.8	89.8	89.8	89.8	89.8	81.2	81.7	81.2	81.9	81.3	81.2
pH of composition	3.7	2.1	3.6	2.1	3.8	3.5	3.7	3.7	7.3	7.1	7.1

Table V

Level of improvement Efficacy of formulae No	0	5	10	15	20	25	30	35	40	45	50
1	0,5	1,5	-	4,0	4,8	5,0	4,0	2,0	-	-	0,5
2	0,5	1,3	1,8	2,7	3,5	3,7	3,2	2,0	1,3	1,0	0,7
3	-	1,5	-	3,2	3,8	4,0	3,5	2,3	-	1,2	-
4	-	1,3	-	2,5	3,3	3,5	3,0	2,2	-	1,0	-
5	0,5	1,5	2,5	3,3	4,3	4,5	3,7	2,3	1,7	1,2	0,7
6	0,5	-	2,5	3,7	4,5	4,8	3,8	2,1	-	0,9	-
7	-	-	3,0	4,3	5,0	5,0	4,5	3,0	-	-	-
8	-	-	2,5	3,7	4,5	4,7	3,8	2,0	-	1,0	-
9	0,5	-	-	1,2	1,7	2,3	2,2	1,7	-	-	0,7
10	-	-	1,0	-	1,7	2,0	1,7	1,3	-	-	-
11	-	-	0,8	-	1,2	1,2	1,2	-	0,8	-	0,5

CLAIMS

1. A disposable impregnated wipe for cleaning and maintaining surfaces, consisting of a woven or non-woven hydrophilic material, obtained by wet or dry method and having a maximum absorption capacity for water of at least 200 % by weight in the dry state, impregnated with an aqueous composition to a level not exceeding 50 % of the maximum absorption capacity, characterized in that the aqueous composition occurs in the form of an aqueous solution containing at least 4 % by weight based on the total weight of the aqueous composition of at least one water-miscible solvent and at least one mineral or organic acid in amount sufficient to produce an acid pH in the said solution.

2. A wipe as claimed in claim 1, characterized in that the pH is between 2 and 5.

3. A wipe as claimed in claim 2, characterized in that the pH is between 3.5 and 3.8.

4. A wipe as claimed in anyone of claims 1 to 3, characterized in that the solution further contains a small amount of a surfactant.

5. A wipe as claimed in anyone of claims 1 to 4, characterized in that the total water-miscible solvent content is 5 to 40 % by weight of the total weight of the aqueous solution.

6. A wipe as claimed in claim 5, characterized in that the solvent(s) is selected from alcohols containing 1 to 4 carbon atoms, glycols and glycol ethers containing 2 to 8 carbon atoms, and volatile silicones.

7. A wipe as claimed in anyone of claims 1 to 6, characterized in that the acid is at least one of acetic, citric, maleic, phosphoric or alkylsulphonic acid.

8. A wipe as claimed in anyone of claims 1 to 7, characterized in that the said solution contains small amounts of at least one disinfectant, perfume, colorant or preservative substance.

9. A wipe as claimed in anyone of claims 1 to 8, characterized in that the said material has grammage of at least 20 g/m<sup>2</sup>.

5 10. A wipe as claimed in anyone of claims 1 to 9, characterized in that the said level of impregnation lies in the range 5 to 35 % of the maximum absorption capacity of the said material in the dry state.

# INTERNATIONAL SEARCH REPORT

International Application No **PCT/EP 88/01088**

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC IPC <sup>4</sup> : <b>A 47 L 1/15; A 47 L 13/17</b>																	
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; margin-top: 10px;">Minimum Documentation Searched <sup>7</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">IPC<sup>4</sup></td> <td style="padding: 5px;">A 47 L 1/00; A 47 L 13/00</td> </tr> </table> <div style="text-align: center; margin-top: 10px; font-size: small;">Documentation Searched other than Minimum Documentation to the extent that such documents are included in the fields searched <sup>8</sup></div>			Classification System	Classification Symbols	IPC <sup>4</sup>	A 47 L 1/00; A 47 L 13/00											
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<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; border-bottom: 1px solid black;">Category <sup>10</sup></th> <th style="width: 60%; border-bottom: 1px solid black;">Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup></th> <th style="width: 30%; border-bottom: 1px solid black;">Relevant to Claim No. <sup>13</sup></th> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="border-right: 1px solid black; padding: 5px;">GB, A, 1461730 (JOHNSON) 19 January 1977 see claims 1-8 --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1, 4, 5</td> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="border-right: 1px solid black; padding: 5px;">EP, A, 0211773 (KIMBERLY-CLARK) 25 February 1987 see claims 1,9 --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="border-right: 1px solid black; padding: 5px;">EP, A, 0001849 (PROCTER &amp; GAMBLE) 16 May 1979 see claims 1-3 --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="border-right: 1px solid black; text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="border-right: 1px solid black; padding: 5px;">US, A, 4338366 (EVANS et al.) 6 July 1982 see claims 1-3,10 -----</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> </table>			Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	X	GB, A, 1461730 (JOHNSON) 19 January 1977 see claims 1-8 --	1, 4, 5	X	EP, A, 0211773 (KIMBERLY-CLARK) 25 February 1987 see claims 1,9 --	1	A	EP, A, 0001849 (PROCTER & GAMBLE) 16 May 1979 see claims 1-3 --	1	A	US, A, 4338366 (EVANS et al.) 6 July 1982 see claims 1-3,10 -----	1
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<div style="display: flex; justify-content: space-between; font-size: x-small;"> <div style="width: 45%;"> <p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>																	
<b>IV. CERTIFICATION</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of the Actual Completion of the International Search  <b>1st February 1989</b> </td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">           Date of Mailing of this International Search Report  <div style="text-align: center; font-size: large;"><b>02 MAR 1989</b></div> </td> </tr> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">           International Searching Authority  <div style="text-align: center;"><b>EUROPEAN PATENT OFFICE</b></div> </td> <td style="border-bottom: 1px solid black; padding: 5px;">           Signature of Authorized Officer  <div style="text-align: center;">   <b>P.C.G. VAN DER PUTTEN</b> </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <b>1st February 1989</b>	Date of Mailing of this International Search Report <div style="text-align: center; font-size: large;"><b>02 MAR 1989</b></div>	International Searching Authority <div style="text-align: center;"><b>EUROPEAN PATENT OFFICE</b></div>	Signature of Authorized Officer <div style="text-align: center;">   <b>P.C.G. VAN DER PUTTEN</b> </div>											
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

EP 8801088  
SA 25613

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 20/02/89. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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